

**DSX-0 CROSS-CONNECT BAY
CONNECTIONS
DIGITAL DATA SYSTEM**

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1. GENERAL

1.01 This section provides the sequence for routing quad jumpers when Digital Data System (DDS) equipment is connected at the 64-kb/s (DS-0) digital system cross-connect (DSX-0) bay. These procedures must be followed in order to eliminate over filling in the interbay ducts of the cross-connect. In conjunction with the routing sequence, there is a procedure to determine the required quad jumper length. The proper length must be used, since excess jumper wire looped in the DSX-0 routing ducts contributes significantly to premature filling and choking of the ducts.

NOTICE

Not for use or disclosure outside the
Bell System except under written agreement

SECTION 314-914-400

1.02 This section is reissued for the following reasons:

- (a) To remove coverage on the 510A Data Service Unit (DSU)
- (b) To add material on the ED-type connector intended for use in Automatic Bit Access Test System (ABATS) testing
- (c) To add coverage of the new DSX-0 planned for the "A" and "N" bays
- (d) To include information from a previous addendum
- (e) To reformat section so that it agrees with the other DDS sections.

Revision arrows are used to show the more significant changes.

1.03 Each individual quad termination in the DSX-0 is uniquely identified and can be located by its alphanumeric code. The code contains the panel number, horizontal row letter, and vertical file number in addition to the standard lineup and bay numbers.

1.04 Connections made at the DSX-0 use a specially designed quad jumper (Section 314-914-100) that requires a special tool for removal. If a jumper is damaged or if a specific length jumper is not available from stock, Section 314-914-300 gives detailed procedures for repair and fabrication of a quad jumper.

1.05 At the DSX-0, it is recommended that the jumpers for one circuit be completely connected before work is begun on another circuit. Each jumper should be terminated completely, following a near- to far-end termination procedure [for example, office channel unit (OCU) to maxtrix unit, matrix unit to substrate data multiplexer (SRDM) on DSX-0A, and SRDM to T1 data multiplexer (T1DM) on DSX-0B]. A general knowledge of the DSX-0 is required for a complete understanding of this section.

1.06 To provide an orderly routing for the quad jumpers, the following sequence of routing must be followed:

- (a) Start routing from the quad termination nearest the vertical center of the DSX-0 (midpoint of panel 5).
- (b) Route through an appropriate fanning slot into the nearest horizontal duct.
- (c) If the end termination is on the same horizontal level as the start termination, route horizontally to a fanning slot appropriate for the end termination.
- (d) If the end termination is on a different horizontal level than the start termination, route horizontally to the nearest vertical duct and then vertically to the horizontal level of the end termination.
- (e) Route horizontally to a fanning slot appropriate for the end termination.
- (f) Route through the fanning slot and terminate.

1.07 In a T1WB5 data-voice multiplexer (T1WB5) local office bay arrangement, one quad terminal panel (QTP) of a DSX-0 allows for routing of 64-kb/s DS-0B level signals to the ports of the T1WB5. In this panel, the quad jumpers need not be routed in any special sequence and the maximum number of 2 1/2 foot long quad jumpers is 23. Figure 1 gives the quad terminal assignment information necessary for making cross-connections from the OCU assembly to the T1WB5 ports.

2. QUAD JUMPER PROCEDURES

2.01 This part contains four different procedures involving the quad jumper of the DSX-0 cross-connect bay. These procedures are used to determine the length of a quad jumper (Charts 1 and 2), route and connection of a quad jumper (Chart 3), and removal of a quad jumper (Chart 4).

DETERMINE QUAD JUMPER LENGTH

2.02 In determining the quad jumper length, only one procedure of the first two procedures (Chart 1 or Chart 2) is used. The first procedure (Chart 1) uses a quad jumper calculator to determine

length. The second procedure (Chart 2) uses a ruler at least 6-inches long to determine the quad jumper length.

A. Jumper Length Calculator (Chart 1)

2.03 The apparatus required to determine the length of a quad jumper in this procedure is a jumper length calculator.

STEP	PROCEDURE
1	Obtain the two alphanumeric codes that identify the connections or the end terminations to be connected (Fig. 2).
2	Using a DSX-0 drawing or its likeness (Fig. 3) as a reference, determine the start termination. <i>Note:</i> The termination nearest the center of the DSX-0 bay (midpoint of panel 5) is the start termination. If both terminations are equal distance from the center, either one may be designated as the start termination.
3	Record the start termination on the circuit card for subsequent jumper removal or rearrangements, if necessary.
4	Using the applicable figures on the back of the jumper length calculator (Fig. 4), determine the index numbers for the start and end terminations. <i>Note 1:</i> The figures on the back of the jumper length calculator illustrate quad starting and terminating configurations. The index number is found on the quad configuration that matches the intended routing path at the DSX-0 panel. <i>Note 2:</i> For a termination with a vertical jumper run, use the figure labeled TERMINATIONS ON DIFFERENT LEVELS—START to obtain the start index number. For a termination with no vertical jumper run, use the figures labeled TERMINATIONS ON SAME LEVEL—START (right) or START (left) to obtain the start index number. All end termination index numbers are determined from the figures labeled TERMINATIONS ON ANY LEVEL—END (from left) or END (from right). <i>Note 3:</i> The term START (right or left) indicates the relative position of the start bay with respect to the end bay. The term END (from right or from left) indicates the direction that the jumper enters the end bay, which is also determined by the relative position of the start and end bays.
5	Following the condensed instructions on the front of the jumper length calculator (Fig. 5), set the start termination index number at the end termination index number on the scales marked for the respective terminations.
6	Using the DSX-0 or its likeness (Fig. 3) as a reference, count the number of DSX-0 bays passed in the horizontal jumper run. <i>Note:</i> DO NOT include the bays containing the start or end terminations in the tally unless the horizontal run crosses the entire width of the bay (Fig. 6).

STEP	PROCEDURE
7	Using the DSX-0 or its likeness (Fig. 3) as a reference, count the number of termination panels passed in the vertical jumper run. Note: DO NOT include the start or end termination panels in the tally unless the panel is part of the vertical run (Fig. 7).
8	Without moving the upper slide from its setting (Step 5), set the number of bays passed in the horizontal run (Step 6) at the number of panels passed in the vertical run (Step 7) by moving only the lower slide and observing the BAYS PASSED and PANELS PASSED scales, respectively (Fig. 5).
9	Using the DSX-0 or its likeness (Fig. 3) as a reference, count the number of filler plates passed in the horizontal jumper run and locate this number on the FILLER PLATES PASSED scale (Fig. 5).
10	Read the number on the JUMPER LENGTH-FT. scale below the number determined in Step 9. This number is the required jumper length. Note: If the scale indication is not on a specific mark (other than a slight deviation), use the nearest indication.
11	Use Table A which lists the quad plug colors to select the proper quad jumper length.

2.04 The following information is an example of the procedure used to determine jumper length. Figures 1 through 10 help to illustrate the procedure.♦

- (a) Assume that the terminations to be connected have the alphanumeric codes 923.14.7.F3 and 923.18.4.B31.
- (b) Termination 4.B31 is the start termination.
- (c) From Fig. 4 and 8, the start index number is 2 and the end index number is 4.
- (d) Index numbers are set as shown in Fig. 9.
- (e) As shown in Fig. 8, the number of bays passed is 4.

- (f) As shown in Fig. 8, the number of panels passed is 4.
- (g) Figure 10 illustrates the calculator setting.
- (h) As shown in Fig. 8, the number of filler plates passed is 4.
- (i) Figure 10 illustrates the calculator setting. The required jumper length is 20 1/2 feet.

B. Scale Measurement (Chart 2)

2.05 ♦The apparatus required to determine the quad jumper length in this procedure is a ruler at least 6-inches long.♦

STEP	PROCEDURE
1	Obtain the alphanumeric codes that identify the terminations to be connected (Fig. 2).
2	In bay X of Fig. 11, locate the segment center nearest the termination in the leftmost bay of the terminations to be connected.
3	In bay Y of Fig. 11, locate the segment center nearest the termination in the rightmost bay of the terminations to be connected.
	Note: If both bay numbers are the same, locate the segment centers in the same bay (X or Y).
4	◆If both segment centers are on the same horizontal level, proceed to Step 9; if not, proceed to next step.
5	Starting from the segment center (either the X or the Y bay) nearest the physical center of the DSX-0, draw a line to the nearest vertical duct segment center.
6	Record on the circuit card the termination used as the starting point to aid in removing the jumper if necessary.
	Note: If both segment centers (determined in Steps 2 and 3) are equal distance from the DSX-0 center line, choose one as the start and continue.
7	Continue drawing the line in the vertical duct in the direction of the other termination through adjacent segment centers to the segment center at the horizontal level of the end termination.
8	Continue drawing the line in the horizontal duct to the end termination segment center and proceed to Step 10.
9	Draw a line between the segment centers determined in Steps 2 and 3.◆
10	Measure the line (both the horizontal and the vertical segments) with the ruler.
11	Add 1 1/4 inches to the measurement determined in Step 10.
12	If the total length is not an exact half-inch, round it off to the next greater half-inch.
13	For each bay between the start and end bays (those <i>not</i> containing either termination), add 3 1/2 inches to the measurement determined in Step 12. This final measurement is the length in <i>feet</i> of the jumper required.
14	◆Use Table A which lists the quad plug colors to select the proper quad jumper length.

2.06 The following example uses the scale measurement procedure to determine the quad jumper length. Figures 12, 13, and 14 help illustrate this procedure.◆

(a) Assume that the terminations to be connected have the alphanumeric codes 923.14.7.F3 and 923.18.4.B31.

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- (b) The segment center nearest the termination 7.F3 is located in Fig. 12.
- (c) The segment center nearest the termination 4.B31 is located in Fig. 13.
- (d) The total line is shown in Fig. 14 as a solid line, dashed line, and a dot/dash line.
- (e) The lines in Fig. 14 measure 8 7/8 inches.
- (f) The 8 7/8 inches plus 1 1/4 inches equals 10 1/8 inches.
- (g) Rounding off to the next higher 1/2 inch yields 10 1/2 inches.

- (h) Three bays are located between the start bay (18) and the end bay (14). Therefore, $3 \times 3 \frac{1}{2}$ inches equals 10 1/2 inches, which added to 10 1/8 inches yields 21 inches. The required jumper length is 21 feet.

ROUTE AND CONNECT QUAD JUMPER (CHART 3)

2.07 ♦The apparatus required to route and connect a quad jumper is a jumper plug extraction tool, part number 91079-01, which is shown in Fig. 15. The quad jumper and its length were determined from Chart 1 or Chart 2.♦

STEP	PROCEDURE
1	Obtain the two alphanumeric codes that identify the terminations to be connected (Fig. 2).
2	Determine the start termination. <i>Note:</i> The termination contained in the panel nearest the center (panel 5) of the DSX-0 is the start termination. If both termination panels are equal distance from the center, either one may be designated as the start termination.
3	♦Verify the start termination is indicated on the circuit card to aid in subsequent jumper removal if necessary.
4	Terminate one end of the jumper in the start termination. <i>Note 1:</i> Polarization grooves (Fig. 16) must be oriented vertically for proper insertion.♦ <i>Note 2:</i> The jumper plug extraction tool may be used to insert the jumper plug if the panel is congested with plugs.
5	Record the bay number, panel number, horizontal row letter, and vertical file number of the end termination alphanumeric code on the hinged duct cover designation strip with a pencil. Record the information in the portion of the designation strip corresponding to the start termination. This designation should provide a positive reference for locating the opposite end of the quad jumper.
6	Open the hinged horizontal duct cover nearest the termination. <i>Note:</i> For terminations with horizontal row letters A through D, use the upper horizontal duct; with horizontal row letters E through H, the lower horizontal duct.
7	Route the jumper through an appropriate fanning slot and into the horizontal duct.

STEP	PROCEDURE
8	Route the jumper to the nearest vertical duct, or if the end termination is on same horizontal level, route horizontally to the fanning slot appropriate for the end termination. <i>Note:</i> For terminations with vertical file numbers 1 through 25, use the vertical duct to the left of the panel; with vertical file numbers 26 through 50, use the vertical duct to the right of the panel unless there is no vertical jumper run.
9	Open the required vertical ducts if vertical routing is necessary. <i>Note:</i> The cover sections of the duct can be completely removed or hinged as shown in Fig. 17.
10	Route the jumper vertically to the horizontal level of the end termination. <i>Note:</i> If both terminations are on the same horizontal level, there is no vertical run and this step does not apply; proceed to the next step.
11	Route horizontally to the fanning slot appropriate for the end termination.
12	Feed the jumper through the fanning slot and terminate it in the end termination. Figure 18 illustrates a typical jumper run.
13	Record the bay number, panel number, horizontal row letter, and vertical file number of the start termination alphanumeric code on the hinged duct cover designation strip with a pencil. Record the information in the portion of the designation strip corresponding to the end termination. This designation should provide a positive reference for locating the opposite end of the quad jumper.
14	Close all open ducts.

REMOVE QUAD JUMPER (CHART 4)

2.08 ♦The apparatus required for this procedure is a jumper plug extraction tool, part number 91079-01. It is shown in Fig. 15.♦

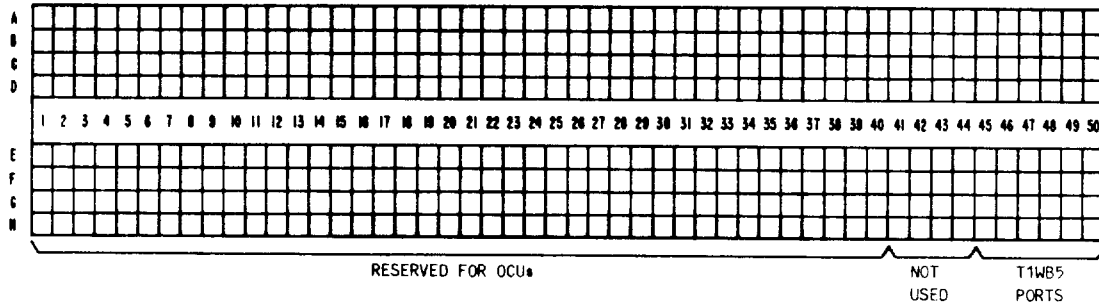
STEP	PROCEDURE
1	Obtain the two alphanumeric codes that identify the terminations to be disconnected (Fig. 2).
2	From the circuit card determine which termination was designated as the start when the jumper was connected.

STEP	PROCEDURE
3	Caution: Ensure that the quad plug being removed is the correct one because a service outage will result from an error.
4	See Caution in Step 3. Using the jumper plug extraction tool (Fig. 16), extract the start termination plug from its socket.
5	Following the jumper wire and using the routing sequence as a guide, open the appropriate ducts, remove the jumper, and close the ducts as required until the end termination is reached.
6	See Caution in Step 3. Using the jumper plug extraction tool, extract the end termination plug from its socket.
7	Close all open ducts.
8	If the quad jumper is not to be replaced, erase the designation information from the hinged duct cover designation strip at each termination location.

TABLE A

QUAD JUMPER LENGTH — COLOR CODE

LENGTH IN FEET						COLOR OF QUAD PLUG
2.0	7.5	13.0	18.5	24.0	29.5	Red
2.5	8.0	13.5	19.0	24.5	30.0	White
3.0	8.5	14.0	19.5	25.0		Light Blue
3.5	9.0	14.5	20.0	25.5		Black
4.0	9.5	15.0	20.5	26.0		Yellow
4.5	10.0	15.5	21.0	26.5		Maroon
5.0	10.5	16.0	21.5	27.0		Green
5.5	11.0	16.5	22.0	27.5		Blue
6.0	11.5	17.0	22.5	28.0		Tan
6.5	12.0	17.5	23.0	28.5		Light Grey
7.0	12.5	18.0	23.5	29.0		Moss Green
Nonstandard length						Violet



*

OCU ASSEMBLY						QUAD TERMINAL LOCATION †
11-FOOT 6-INCH BAY		7-FOOT BAY				
BAY	SHELF †	BAY	SHELF †	BAY	SHELF †	
NOTE 1	1	NOTE 5	1	NOTE 10	1	H1-10
	2		2		2	H11-20
	15		3		8	H21-30
	16	NOTE 6	6		9	H31-40
	18		7		2	G1-10
19	10	3	6	G11-20		
NOTE 2	2	NOTE 7	10	NOTE 11	6	G21-30
	3		11		7	G31-40
	6		2		10	F1-10
	7		3		11	F11-20
	10		6		2	F21-30
11	7	3	F31-40			
14	10	6	E1-10			
15	11	7	E11-20			
NOTE 3	2	NOTE 8	2	NOTE 12	10	E21-30
	3		3		11	E31-40
	6		6		2	D1-10
	7		7		3	D11-20
	10		10		6	D21-30
11	11	7	D31-40			
14	2	10	C1-10			
15	3	11	C11-20			
NOTE 4	2	NOTE 9	6	NOTE 13	2	C21-30
	3		7		3	C31-40

*

T1WB5 PORT NO.	QUAD TERMINAL LOCATION
1	H45
2	H46
3	H47
4	H48
5	H49
6	H50
7	G45
8	G46
9	G47
10	G48
11	G49
12	G50
13	F45
14	F46
15	F47
16	F48
17	F49
18	F50
19	E45
20	E46
21	E47
22	E48
23	E49
24	E50

NOTES:

- | | |
|---------------------------|----------------------------|
| 1. J70177Y BAY | 8. J70177G BAY (3RD) |
| 2. J70177B BAY (1ST) | 9. J70177G BAY (4TH) |
| 3. J70177B BAY (2ND) | 10. J70177W BAY E/W LIST 5 |
| 4. J70177B BAY (3RD) | 11. J70177G BAY (1ST) |
| 5. J70177W BAY E/W LIST 4 | 12. J70177G BAY (2ND) |
| 6. J70177G BAY (1ST) | 13. J70177G BAY (3RD) |
| 7. J70177G BAY (2ND) | 14. J70177G BAY (4TH) |

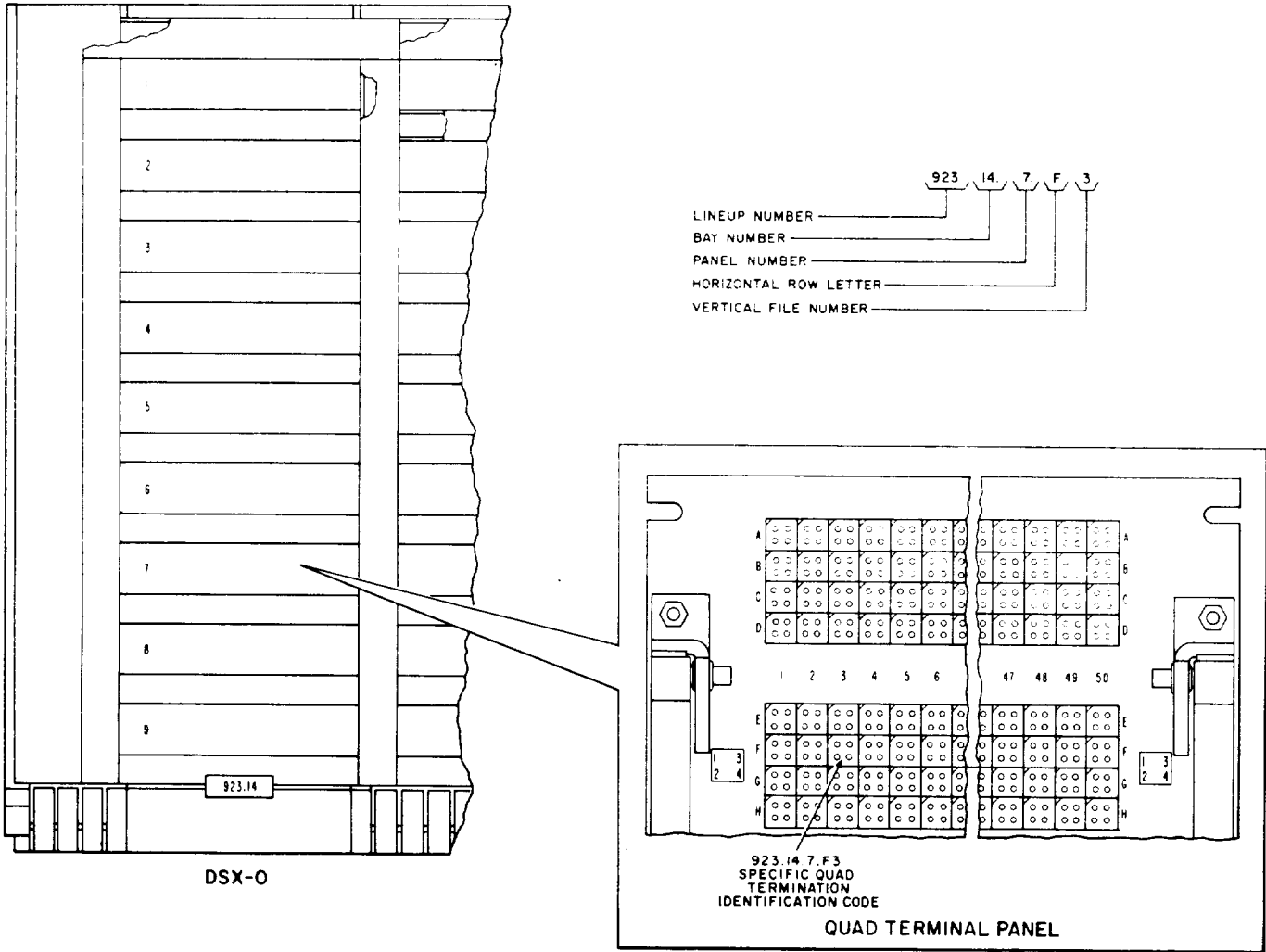
* THIS CHART IS ARRANGED FOR MAXIMUM UTILIZATION [10-CHANNEL INTEGRAL SUBRATE MULTIPLEXERS (ISMxs) ARE USED AND ALL 24 T1WB5 PORTS ARE ASSIGNED]

† THE SHELVES ARE NUMBERED IN ACCORDANCE WITH THE STANDARD NUMBERING PLAN (SEE APPENDIX 1 OF SECTION 682-300-020)

‡ IF A SHELF IS EQUIPPED WITH DRIVER-TERMINATOR BOARDS, ALL TEN OCUS IN A SHELF ARE TERMINATED ON THE QTP. IF A SHELF IS EQUIPPED WITH 5-CHANNEL ISMxs, ONLY THE FIRST AND SIXTH TERMINATIONS IN EACH GROUP OF TEN ARE "LIVE;" IF A SHELF IS EQUIPPED WITH A 10-CHANNEL ISMX, ONLY THE FIRST TERMINATION IN EACH GROUP IS "LIVE." THESE TERMINATIONS CORRESPOND TO THE MULTIPLEXED OUTPUT OF THE ISMX.

Fig. 1—Quad Terminal Panel Assignment for T1WB5 Bay

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◆ Fig. 2—Alphanumeric Designation Code ◆

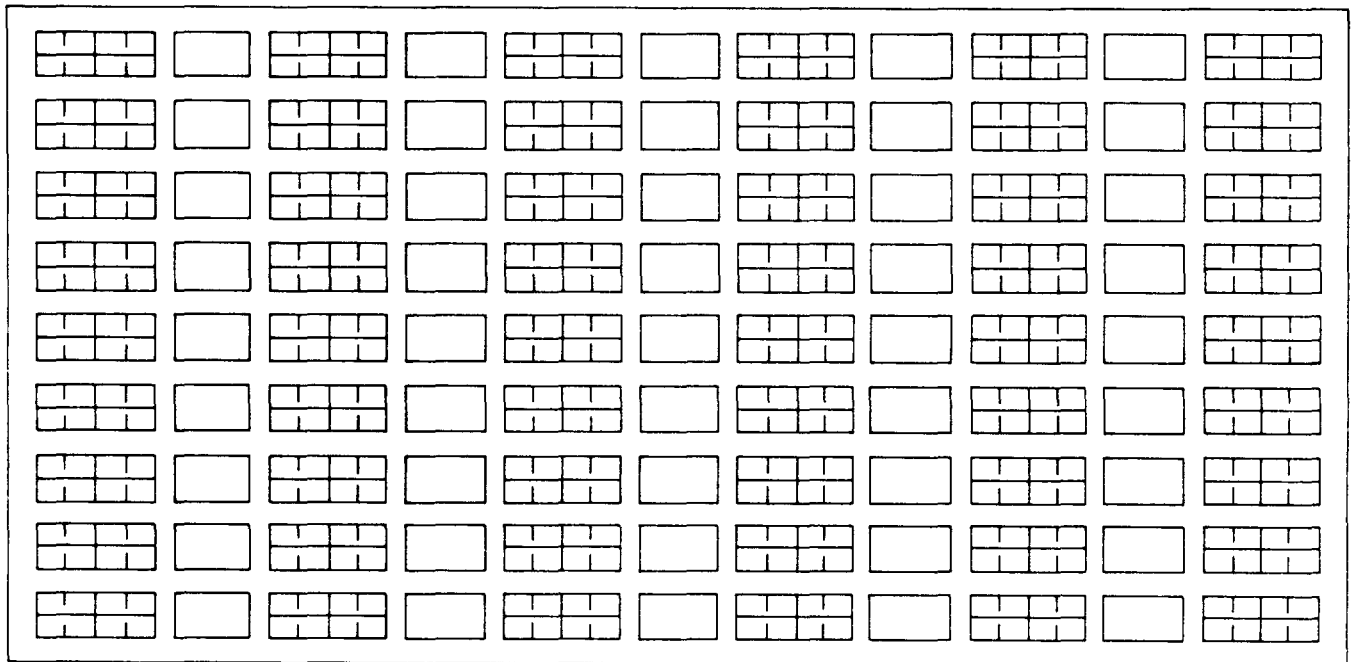


Fig. 3—Drawing Likeness of DSX-0

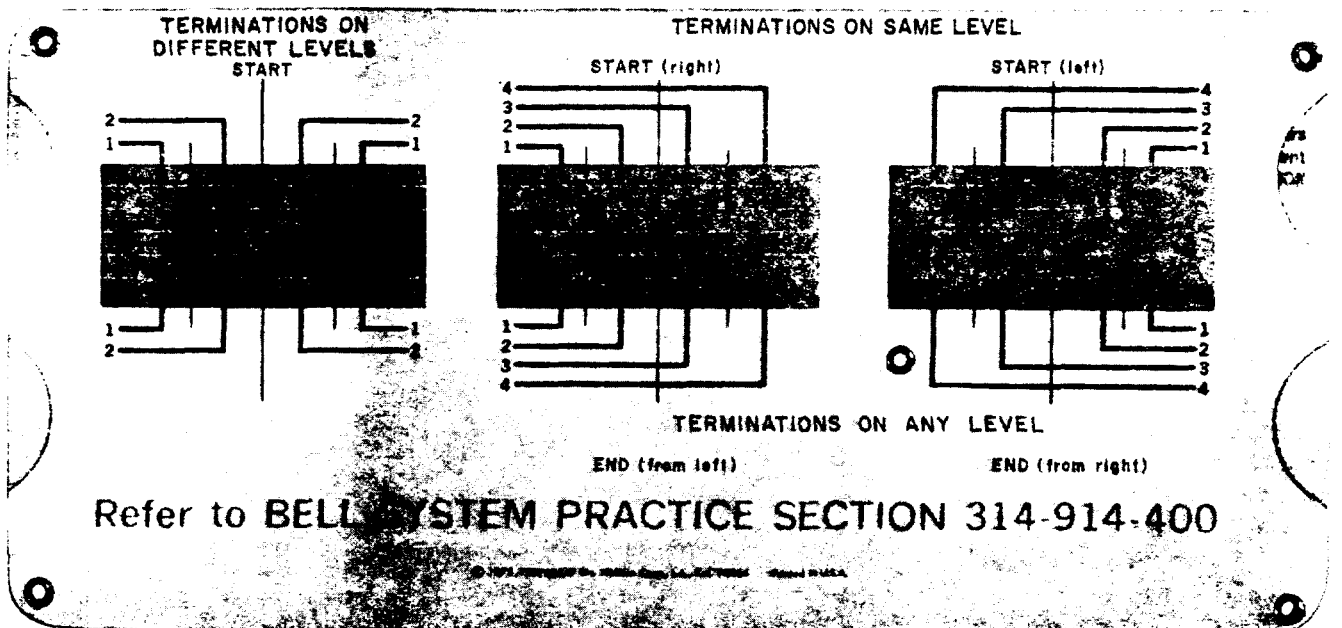


Fig. 4—Jumper Length Calculator—Back View

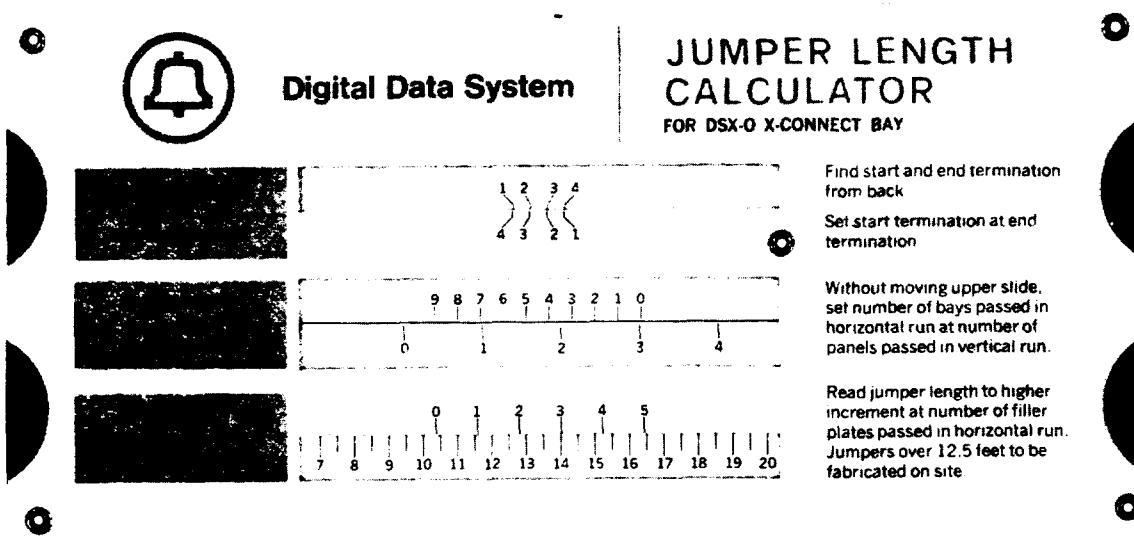
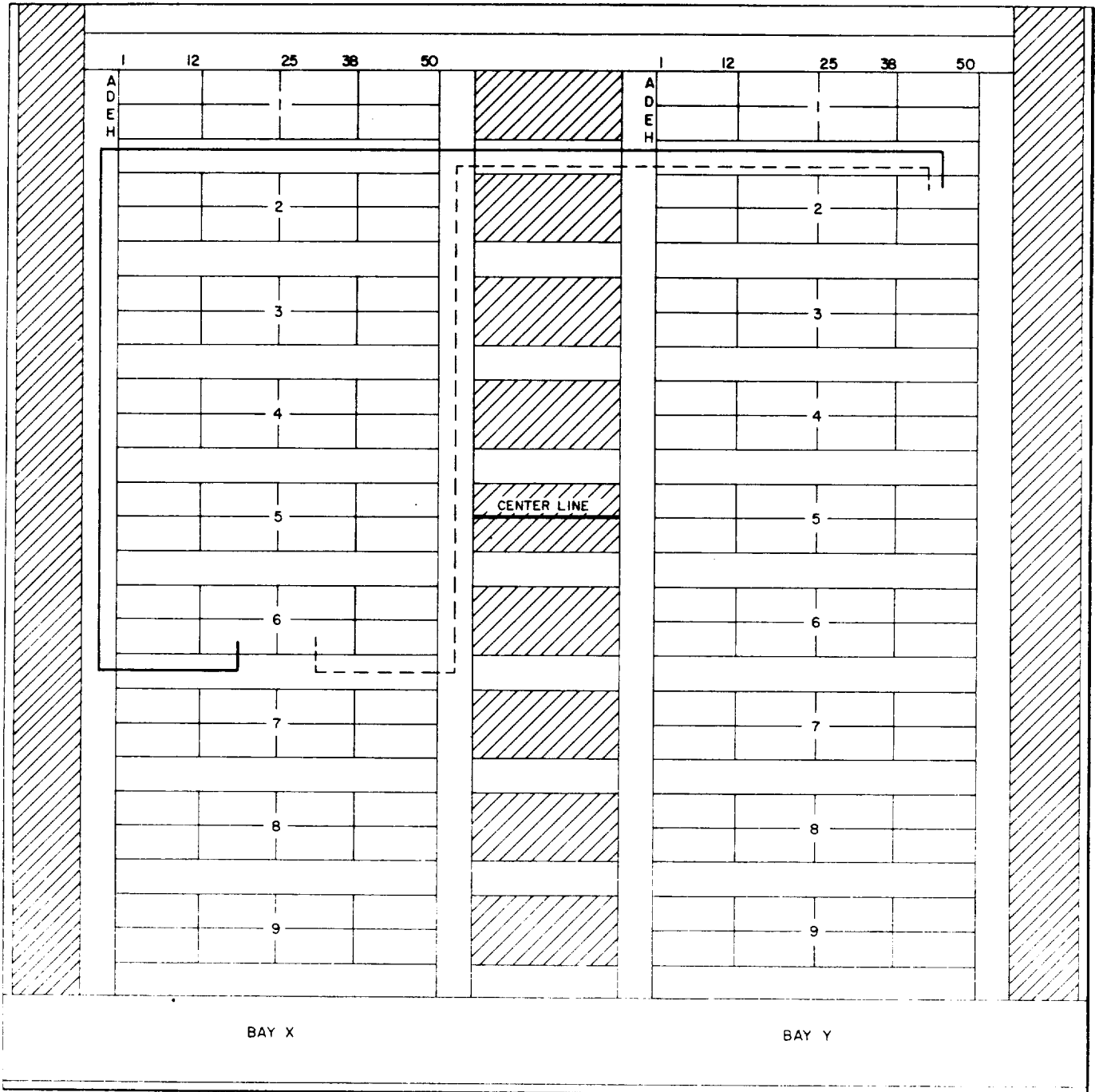


Fig. 5—Jumper Length Calculator—Front View



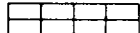



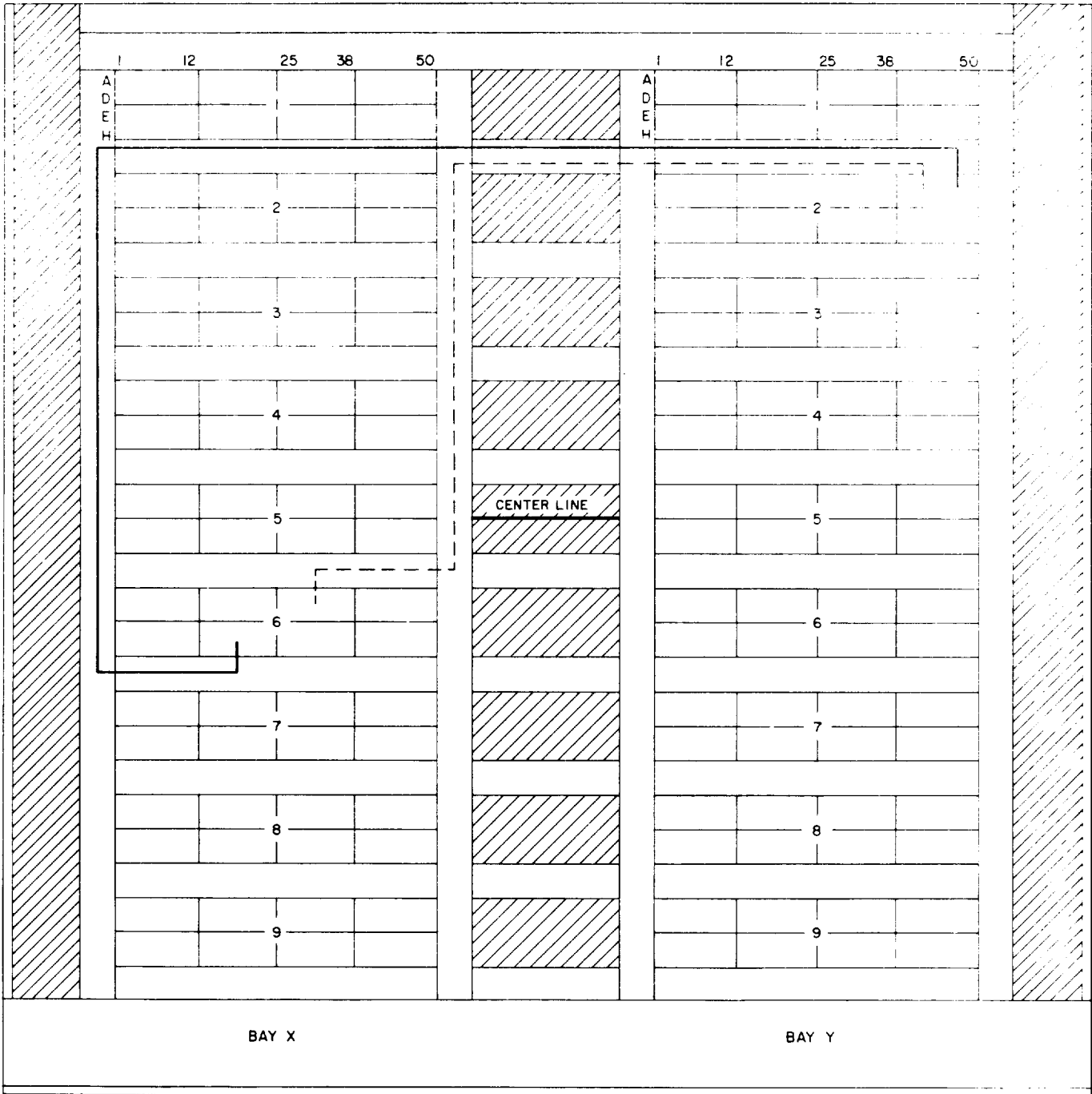
- LEGEND
-  PANEL
 -  FILLER PLATE
 -  START BAY INCLUDED IN HORIZONTAL RUN (EXAMPLE: 1 BAY PASSED)
 -  START BAY NOT INCLUDED IN HORIZONTAL RUN (EXAMPLE: 0 BAYS PASSED)

Fig. 6—Horizontal Run Considerations



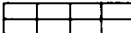
- LEGEND
-  PANEL
 -  FILLER PLATE
 -  START PANEL INCLUDED IN VERTICAL RUN (EXAMPLE: 5 PANELS PASSED)
 -  START PANEL NOT INCLUDED IN VERTICAL RUN (EXAMPLE: 4 PANELS PASSED)

Fig. 7—Vertical Run Considerations

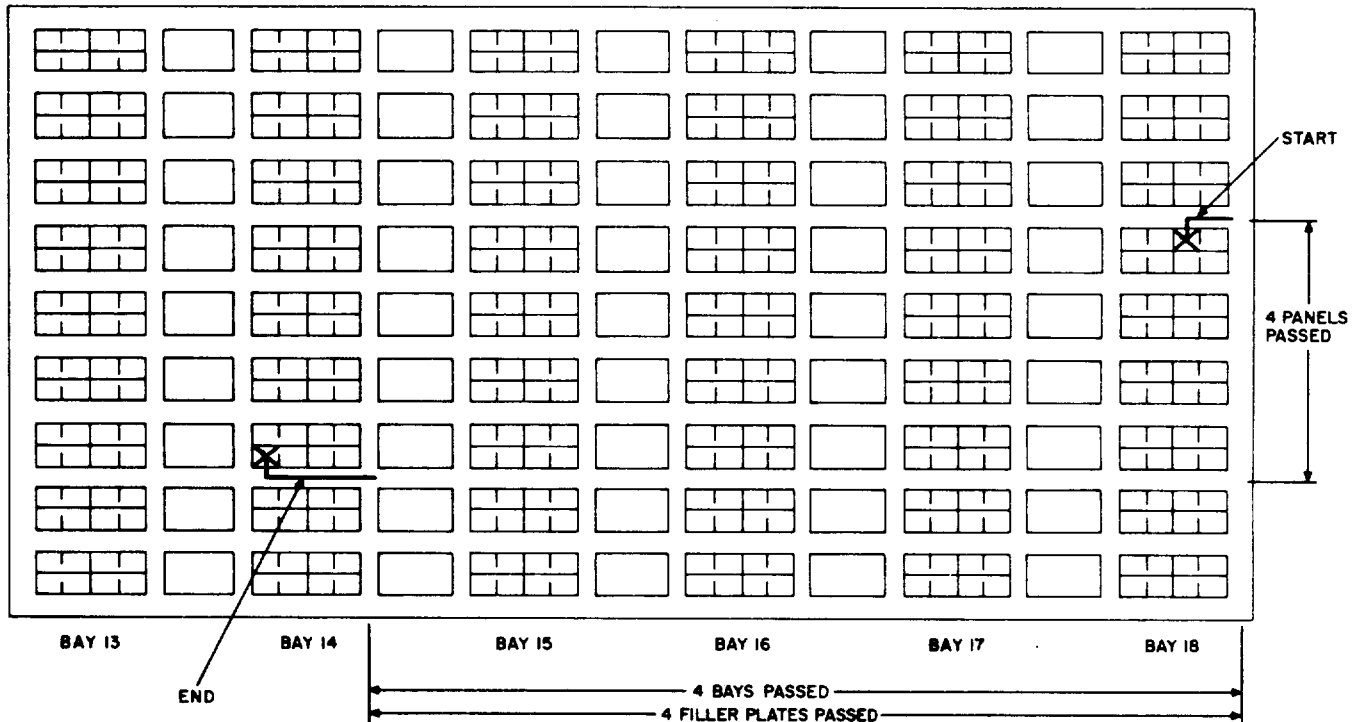


Fig. 8—Jumper Length Calculator Example

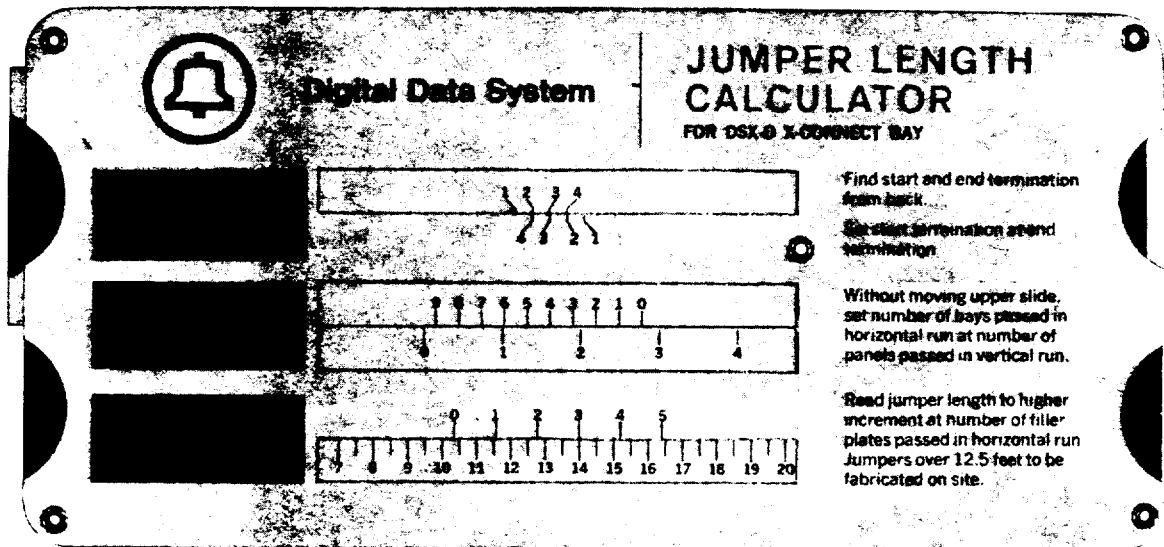


Fig. 9—Initial Setting of Jumper Length Calculator

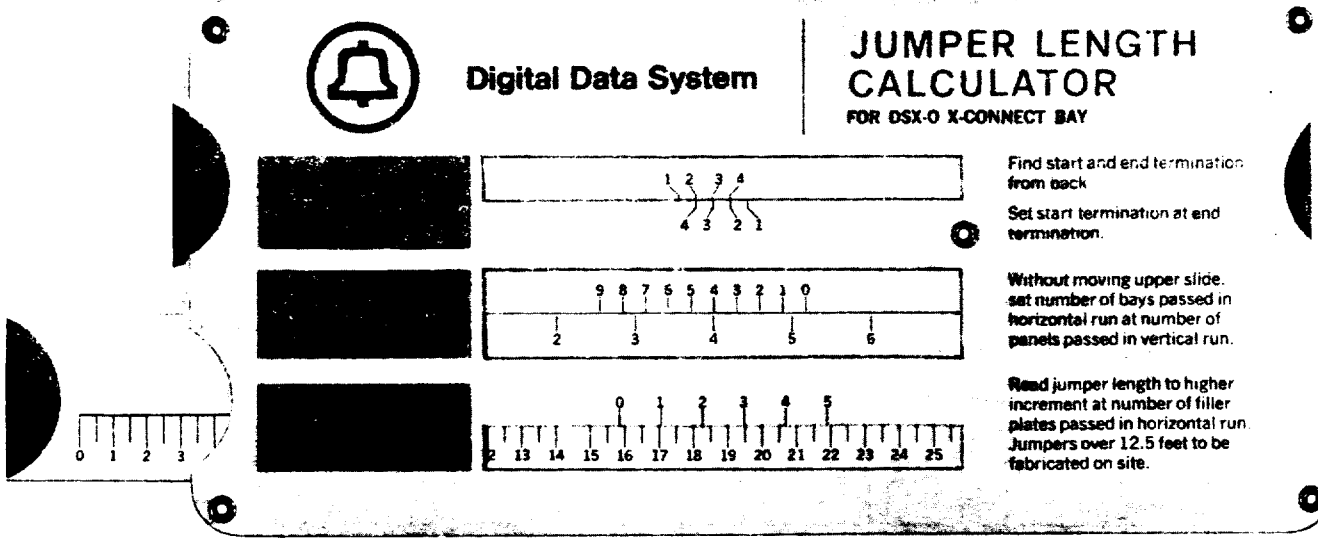


Fig. 10—Final Setting of Jumper Length Calculator

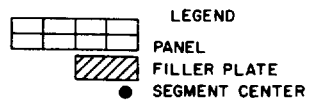
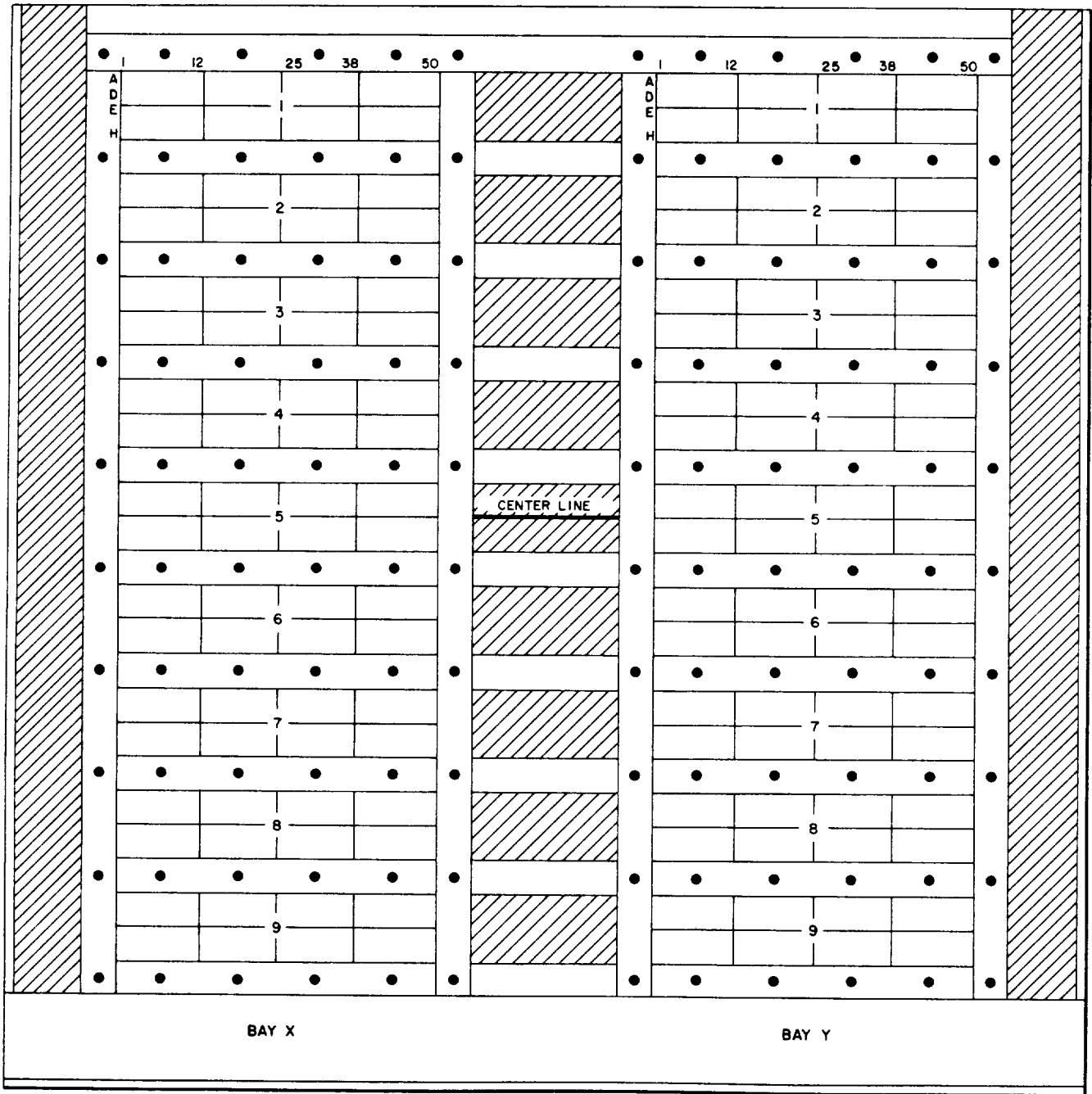


Fig. 11—Quad Jumper Length Worksheet

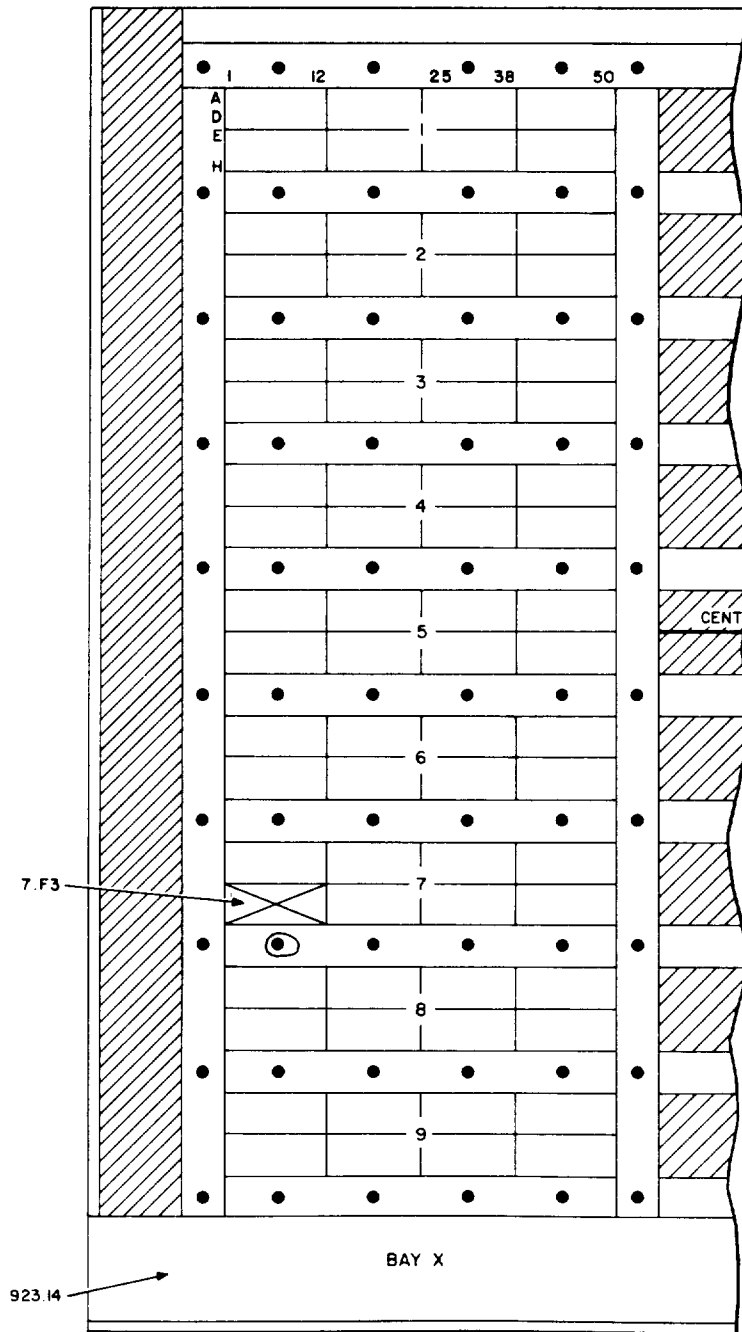


Fig. 12—Bay X Termination Location

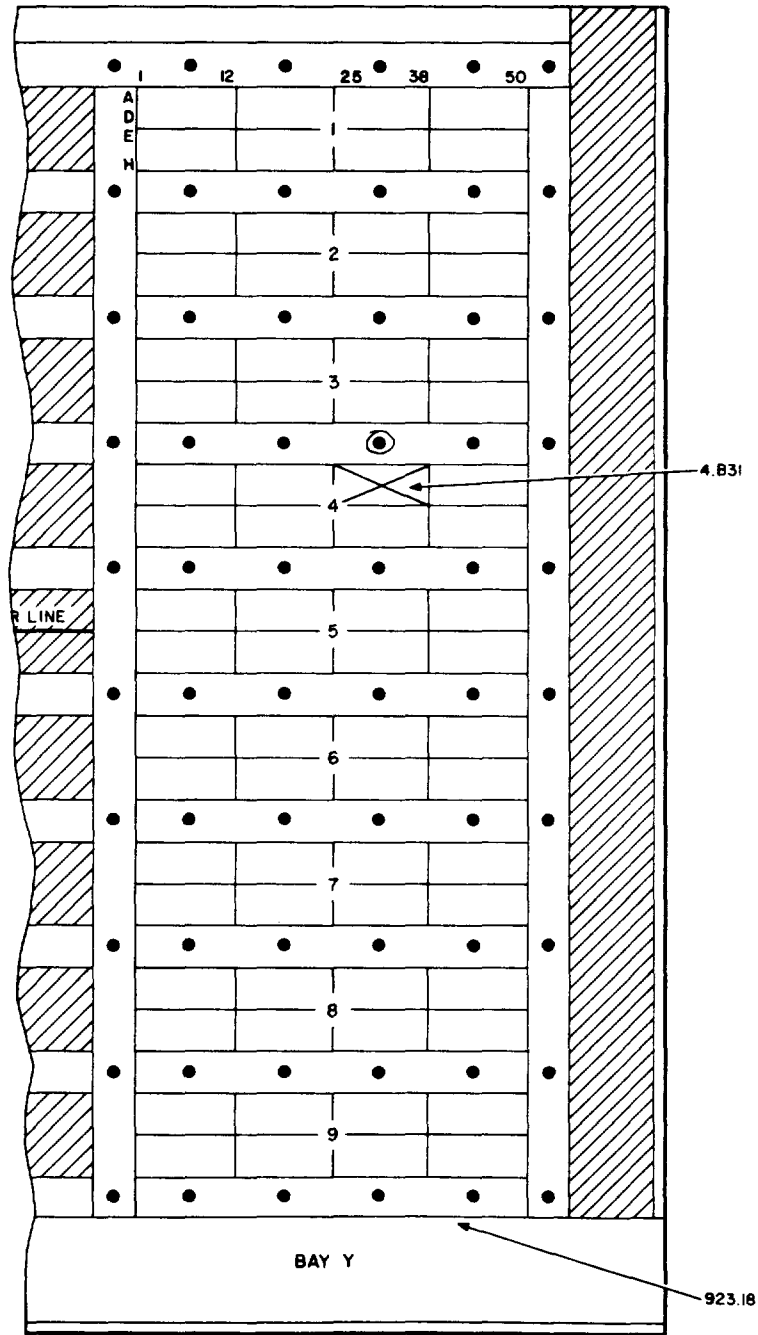


Fig. 13—Bay Y Termination Location

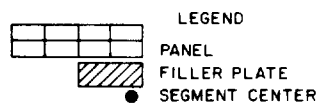
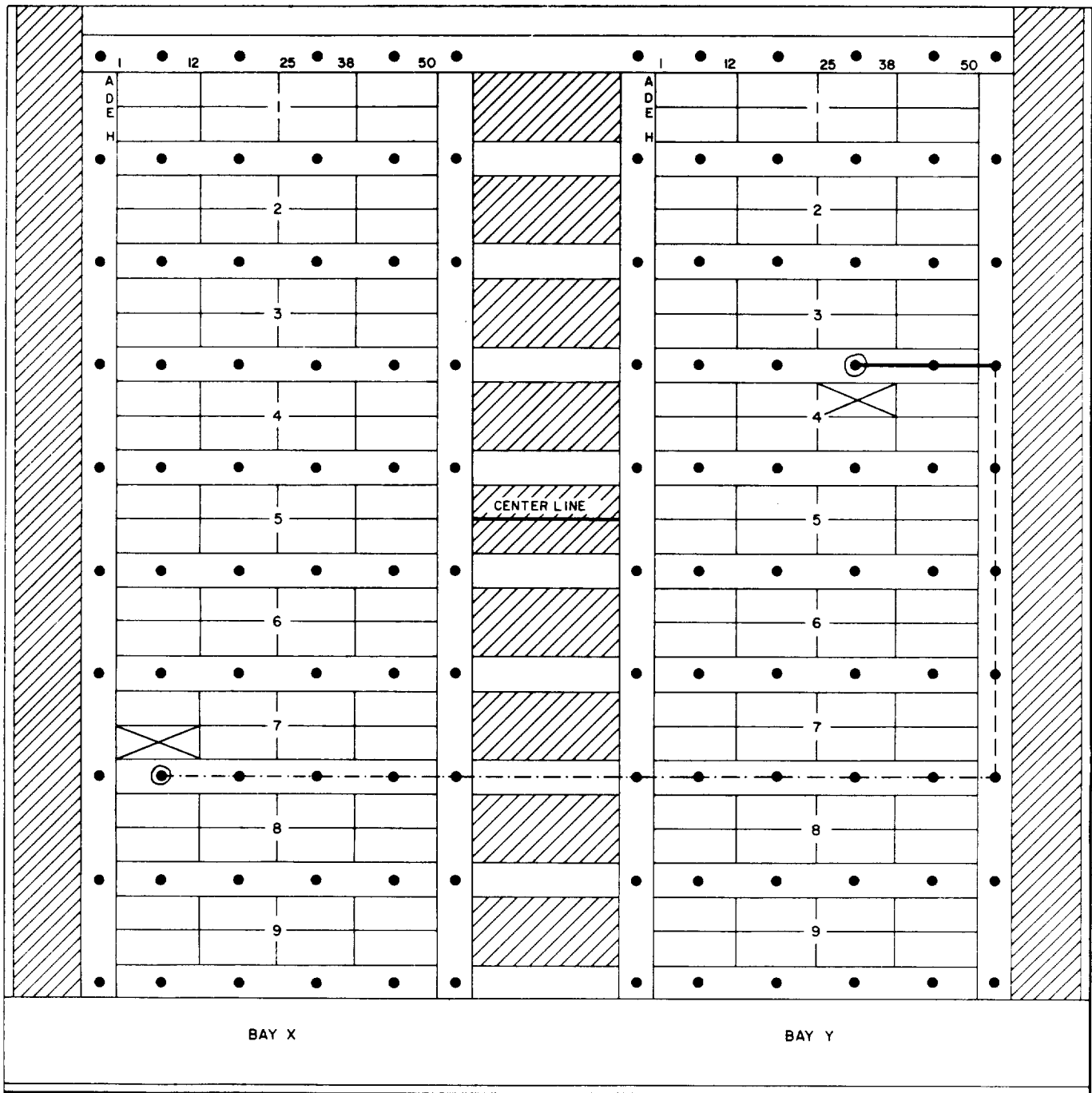


Fig. 14—Scale Jumper Distance Measurement

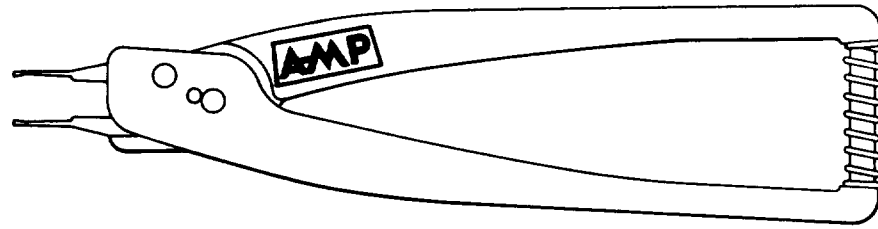


Fig. 15—Jumper Plug Extraction Tool

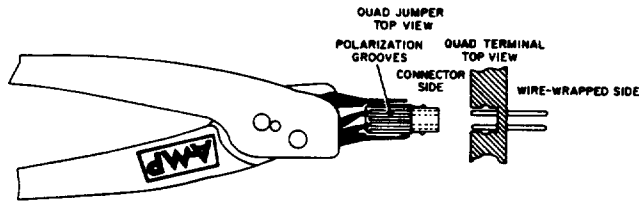


Fig. 16—Quad Plug and Extraction Tool

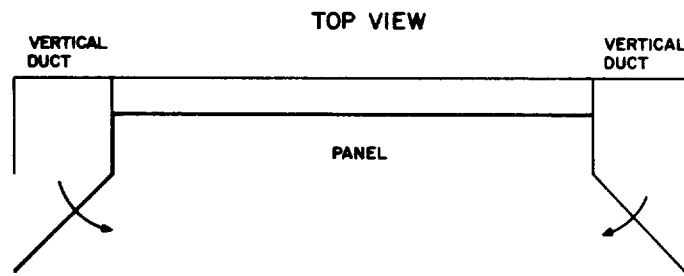
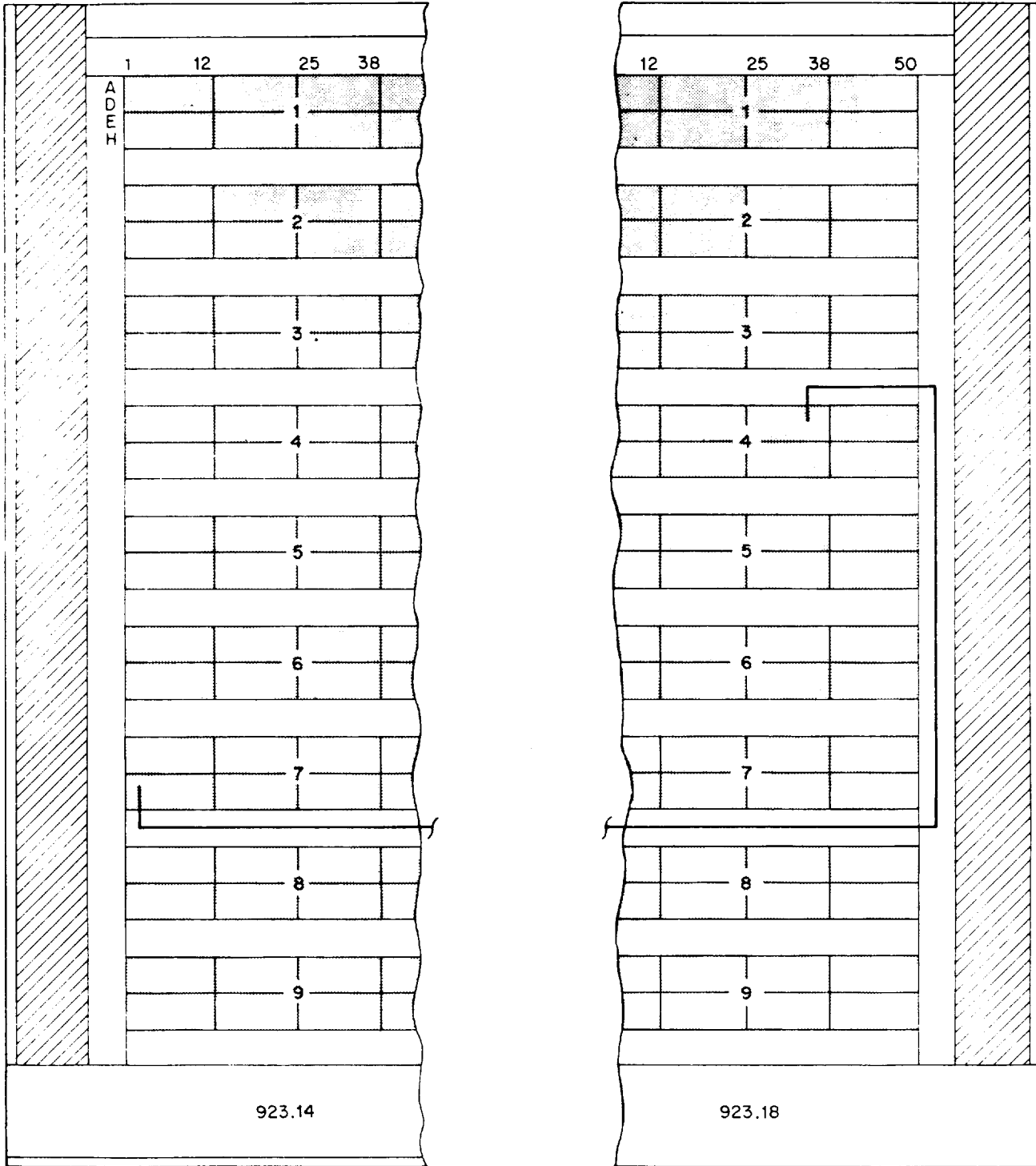


Fig. 17—Hinging the Vertical Duct Cover



◆ Fig. 18—Sample Quad Jumper Connection Between 923.14.7.F3 and 923.18.4.B31 ◆